

CLAIMS

WE CLAIM

1. Chemical vapor deposition apparatus, comprising a heated coating chamber, and a coating gas supply conduit disposed along a length of said coating chamber so that said coating gas is preheated, and a gas distribution conduit disposed about said conduit for distributing preheated coating gas to said chamber.

2. The apparatus of claim 1 wherein said conduit includes a gas discharge opening proximate a bottom of said gas distribution conduit.

3. The apparatus of claim 1 including a gas manifold above said coating chamber upstream of said conduit and communicated to said conduit, said gas manifold having a heater device therein to heat said coating gas prior to its entering said conduit.

4. The apparatus of claim 1 including one or more radiant heat shields above said coating chamber.

5. Chemical vapor deposition apparatus, comprising a heated retort having a coating chamber therein, said coating chamber having a plurality of coating zones along its length in said retort, a coating gas supply conduit disposed along said length of said coating chamber so that said coating gas is preheated, and a gas distribution conduit disposed about said conduit for distributing preheated coating gas to said coating zones.

6. The apparatus of claim 5 wherein said conduit includes a gas discharge opening to said gas distribution conduit proximate a lowermost coating zone.

7. The apparatus of claim 5 including a gas manifold in said retort above said coating chamber and communicated to said conduit, said gas manifold having a heater device therein to heat said coating gas prior to its entering said conduit.

8. The apparatus of claim 5 including one or more radiant heat shields in said retort above said coating chamber.

9. The apparatus of claim 5 wherein said conduit includes a bleed opening communicated to said gas distribution conduit above a lower primary gas discharge opening.

10. The apparatus of claim 9 wherein said conduit includes a plurality of bleed openings along a length of said gas distribution conduit.

11. The apparatus of claim 9 wherein said gas distribution conduit includes a plurality of gas discharge openings at each coating zone to supply preheated coating gas thereto.

12. The apparatus of claim 11 wherein said gas discharge openings are located at the mid-point of each said coating zone.

13. The apparatus of claim 11 including a manifold wall opposing said gas discharge openings at each coating zone, said manifold wall having a plurality of gas flow openings that are out of alignment with said gas discharge openings at each coating zone such that there is no line-of-sight gas flow path from said gas discharge openings to said gas flow openings at each coating zone.

14. The apparatus of claim 5 including a baffle about each coating zone, said baffle including openings through which spent coating gas is exhausted from each coating zone.

15. Chemical vapor deposition apparatus, comprising a heated retort having a coating chamber therein, said coating chamber having a plurality of coating zones along its length in said retort, a preheat conduit for providing a coating gas to said coating chamber, a gas distribution conduit disposed about said preheat conduit in said coating chamber to receive preheated coating gas from said preheat conduit and supplying it to said coating zones, said gas distribution conduit includes a plurality of gas discharge openings at each coating zone to supply preheated coating gas thereto.

16. The apparatus of claim 15 wherein said gas discharge openings are located at the mid-point of each said coating zone.

17. The apparatus of claim 16 including a manifold wall opposing said gas discharge openings at each coating zone, said manifold wall having a plurality of gas flow openings that are out of alignment with said gas discharge openings at each coating zone such that there is no line-of-sight gas flow path from said gas discharge openings to said gas flow openings at each coating zone.

18. The apparatus of claim 15 including a baffle about each coating zone, said baffle including openings through which spent coating gas is exhausted from each coating zone.

19. A method of chemical vapor deposition, comprising flowing coating gas into a heated coating chamber along a length thereof, heating said coating gas as it flows through said conduit, and discharging the preheated coating gas into a gas distribution conduit in said coating chamber.

20. The method of claim 19 including heating said coating chamber by disposing it in a heated retort.

21. The method of claim 19 including discharging the preheated coating gas at a lower end of said conduit.

22. The method of claim 19 including preheating the coating gas before it enters said conduit.

23. The method of claim 22 wherein the coating gas is preheated in a gas manifold disposed outside said coating chamber upstream of said conduit.

24. The method of claim 19 including also discharging the preheated coating gas through a bleed opening above said lower end of said conduit.

25. The method of claim 24 including discharging the preheated coating gas from said gas distribution conduit disposed to each of plurality of coating zones along a length of said coating chamber.

26. The method of claim 25 including discharging the preheated coating gas from gas distribution conduit at a mid-point of each said coating zone.

27. The method of claim 25 including discharging the preheated coating gas from gas distribution conduit at an opposing manifold wall at each coating zone, said manifold wall having a plurality of gas flow openings that are out of alignment with said gas discharge openings at each coating zone such that there is no line-of-sight gas flow path from said gas discharge openings to said gas flow openings at each coating zone.

28. The method of claim 25 including exhausting spent coating gas from each coating zone through openings in a baffle disposed about each coating zone.

29. The method of claim 19 including reflecting radiant heat from said coating chamber back toward said coating chamber.

30. A method of chemical vapor deposition, comprising flowing coating gas in a conduit into a heated coating chamber, discharging the coating gas into a gas distribution conduit disposed about said conduit in said coating chamber, and supplying said coating gas from said gas distribution conduit to a plurality of coating zones along a length of said coating chamber.

31. The method of claim 30 including discharging the coating gas from gas distribution conduit at a mid-point of each said coating zone.

32. The method of claim 30 including discharging the coating gas from gas distribution conduit at an opposing manifold wall at each coating zone, said manifold wall having a plurality of gas flow openings that are out of alignment with said gas discharge openings at each coating zone such that there is no line-of-sight gas flow path from said gas discharge openings to said gas flow openings at each coating zone.

33. The method of claim 30 including exhausting spent coating gas from each coating zone through openings in a baffle disposed about each coating zone.